SCIENCE NEWS
STARS

Cosmic Blast

High-energy gamma rays from exploding stars in a nearby galaxy are detected by a CANGAROO in the Australian outback.

by Pamela L. Gay

The CANGAROO-II telescope is located in Australia.
M. Mori

Nothing with mass can travel at the speed of light, but galactic cosmic ray particles come close. These fast-moving particles create gamma-ray photons as they interact with interstellar gas and dust. Recently, astronomers studied cosmic gamma rays with the CANGAROO (**C**ollaboration of **A**ustralia and **N**ippon for a **Ga**mma **R**ay **O**bservatory in the **O**utback) II telescope in Australia to determine that star explosions are the primary source of galactic cosmic rays.

For every cause there is an effect. The CANGAROO research relied on this basic premise. Cosmic rays cause gamma rays. Gamma rays, in turn, create flashes of light called Cherenkov radiation in Earth's atmosphere. However, scientists aren't sure where extragalactic cosmic rays come from but hypothesized that star explosions produce them. When Japanese scientist Chie Itoh and her colleagues pointed the CANGAROO-II telescope at the starburst galaxy NGC 253, they detected Cherenkov radiation. After further analysis, they surmised that star explosions in NGC 253 were the initial cause that created this effect.

The gamma-ray photons that were detected via Cherenkov radiation had energies millions of times greater then the energies of photons with optical wavelengths. These tera-electron-volt (TeV) gamma rays had not been detected in prior studies of normal nearby galaxies. Our own galaxy contains diffuse TeV gamma ray emission thought to be linked to supernova remnants.

Starburst galaxy NGC 253 is estimated to undergo one supernova every three years.
AURA / STScI / NASA

This study of NGC 253 demonstrates that ground-based telescopes can study gamma ray sources indirectly. This means that telescopes such as CANGAROO-II will be able to support NASA's Gamma ray Large Area Space Telescope (GLAST) when it launches in 2006. With a 10-meter-diameter collecting area, CANGAROO-II is expected to uncover a multitude of new TeV sources. NGC 253 is just the twelfth TeV gamma-ray source discovered so far.

"With CANGAROO-II, it's like we have propped open the window to the universe by a few more inches, expanding our view," says team member Shohei Yanagita.

Email-A-Friend

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